

Appln. No. 10/550,829
Amdt. Dated: January 23, 2008
Reply to Office Action of October 26, 2007

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application. Please amend claims 1 – 14, and 17:

Listing of Claims:

1. (Currently Amended) A ~~solution~~ bath for etching copper or a copper alloy, said ~~solution~~ bath having a pH ~~on the order of about~~ 4 or less, comprising:
 - a) at least one oxidizing agent selected from the group ~~comprising~~ consisting of hydrogen peroxide and peracids and
 - b) at least one substance selected from the group ~~comprising~~ consisting of aromatic sulfonic acids, ~~and salts of the aromatic sulfonic acids,~~ aqueous solutions of aromatic sulfonic acids, and aqueous solutions of salts of aromatic sulfonic acids ~~characterized in that the solution is free of sulfate ions~~ wherein the bath has a sulfate ion concentration that is less than the product of 2 grams/liter and the volume percent of said at least one substance in the bath.
2. (Currently Amended) The ~~solution~~ bath according to claim 1, characterized in that ~~it~~ the bath further comprises at least one N-heterocyclic compound.
3. (Currently Amended) The ~~solution~~ bath according to claim 2, characterized in that the concentration of the N-heterocyclic compounds is in the range of from about 0.1 to about 300 g/l.
4. (Currently Amended) The ~~solution~~ bath according to any one of claims 2 and 3, characterized in that at least one N-heterocyclic compound is selected from the group comprising mono-N, di-N, tri-N, and tetra-N heterocyclic compounds.
5. (Currently Amended) The ~~solution~~ bath according to any one of claims 2-3,

characterized in that at least one N-heterocyclic compound is selected from the group ~~comprising~~ consisting of pyridine, N-methyl pyrrolidone, adenine, guanine, uric acid, imidazole, pyrazole, piperazine, pyrrolidone, pyrroline, triazole, tetrazole and the derivatives thereof.

6. (Currently Amended) The ~~solution~~ bath according to any one of the preceding claims 1-3, characterized in that the concentration of the substances is in the range of from about 5 to about 250 g/l.

7. (Currently Amended) The ~~solution~~ bath according to any one of the preceding claims 1-3, characterized in that at least one salt of the aromatic sulfonic acids is selected from the group ~~comprising~~ consisting of sodium and potassium salts.

8. (Currently Amended) The ~~solution~~ bath according to any one of the preceding claims 1-3, characterized in that the aromatic part of at least one aromatic sulfonic acid or of at least one salt of the aromatic sulfonic acids comprises at least one phenyl group.

9. (Currently Amended) The ~~solution~~ bath according to claim 8, characterized in that at least one phenyl group is substituted by one or more radicals selected from the group ~~comprising~~ consisting of nitro, amino, hydroxy, halogen, C₁ - C₅-alkyl radicals and C₁ - C₅ alkoxy radicals.

10. (Currently Amended) The ~~solution~~ bath according to any one of the preceding claims 1-3, characterized in that at least one aromatic sulfonic acid is selected from the group ~~comprising~~ consisting of benzene sulfonic acid, phenol sulfonic acid, toluene sulfonic acid, amino benzene sulfonic acid and naphthalene sulfonic acid.

11. (Currently Amended) The ~~solution~~ bath according to any one of the preceding claims 1-3, characterized in that the solution comprises at least one adjuvant selected from the group ~~comprising~~ consisting of polyethylene glycol, polypropylene glycol and the derivatives thereof.

12. (Currently Amended) A method of producing electrical circuit carriers or for the semiconductor technique in vertical and horizontal lines or for producing leadframes in RTR systems or for producing multipoint connectors and contacts in switches, plug and socket connectors, sockets, and plugs comprising etching a copper surface by contacting said copper surface with the ~~solution~~ bath according to any one of claims 1-3.

13. (Currently Amended) A method for depositing metal to the surface of copper or a copper alloy, said method comprising the following method steps:

- a) contacting the surface with the ~~solution~~ bath in accordance with any one of claims 1-3 and
- b) coating the surface with at least one metal.

14. (Currently Amended) The method according to claim 13, characterized in that the substrate is selected from the group ~~comprising~~ consisting of electrical circuit carriers, leadframes, multipoint connectors and contacts in switches, plug and socket connectors, sockets and plugs.

15. (Previously Presented) The method according to claim 13, characterized in that the substrate is contacted with an acidic cleaning fluid prior to method step a).

16. (Previously Presented) The method according to claim 13, characterized in that the substrate is contacted with sulfuric acid-prior to method step b).

17. (Currently Amended) The method according to claim 13, characterized in that the metal is selected from the group ~~comprising~~ consisting of copper, tin, gold, silver, palladium, bismuth and nickel.

18. (Original) The method according to claim 17, characterized in that the metal is electroless nickel-gold or chemical tin.

19. (Previously Presented) The method according to claim 13 for producing electrical circuit carriers or for the semiconductor technique in vertical and/or horizontal lines or for producing leadframes in RTR-systems.